

Installation Instructions

379A

Models
48W- & 60W-379A
Series C

OUTDOOR HEATING UNIT

bryant

39379D36
4/15/72

Bryant Models 48W-379A and 60W-379A are outdoor heating units designed for installation on a rooftop or at ground level. Both models have a chilled water coil factory installed. Model 48W-379A is equipped with a 48,000 Btuh coil while Model 60W-379A is equipped with a 60,000 Btuh coil.

These units were designed for use in split systems with matching Bryant gas-fired water chillers. Both models have 150,000 Btuh heating input rating and a 112,500 Btuh heating output rating. Model 48W-379A has a 48,000 Btuh cooling rating when connected to a Bryant Model 48-453 Gas-Fired Water Chiller. Model 60W-379A has 60,000 Btuh cooling rating when connected to a matching Bryant Model 60-452 Gas-Fired Water Chiller.

Important—Read before Installing

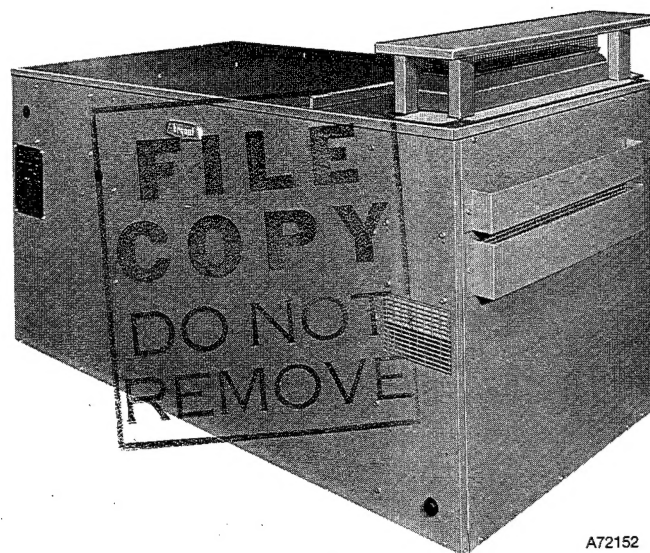
1. Check all local or other applicable codes for information concerning proximity to property lines, height above roof, obstructions, etc.
2. Be sure the power supply available (voltage, frequency, and phase) corresponds to that specified on the unit rating plate.
3. Check the electrical service provided by the utility for the building to be sure that the service capacity is sufficient to handle the load imposed by this unit.
4. Refer to the regulations of the serving gas supplier and the local building, heating, plumbing, or other codes in effect in the area in which installation is to be made.
5. Refer to the dimensional drawing on page 2 for location of electrical, gas, and chilled water connections prior to setting the unit in place.

GENERAL

The design of this unit is certified by A.G.A. for use with natural or propane gases with appropriate controls and orifices. This unit is designed for outdoor installation only.

Installation of the unit consists of the following:

- I. Locating the Unit
- II. Gas Piping
- III. Duct Connections
- IV. Venting
- V. Coil Connections
- VI. Electrical Connections
- VII. Start-up and Adjustments



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Figure 1—Model 48W-379A

In addition, the following section should be reviewed by the equipment owner.

VIII. Maintenance

I. LOCATING THE UNIT

Extreme caution should be used when rigging and moving the unit to prevent damage. The unit should be kept upright during all rigging and moving operations. To facilitate lifting and moving, place the unit in an adequate sling made of rope or cable.

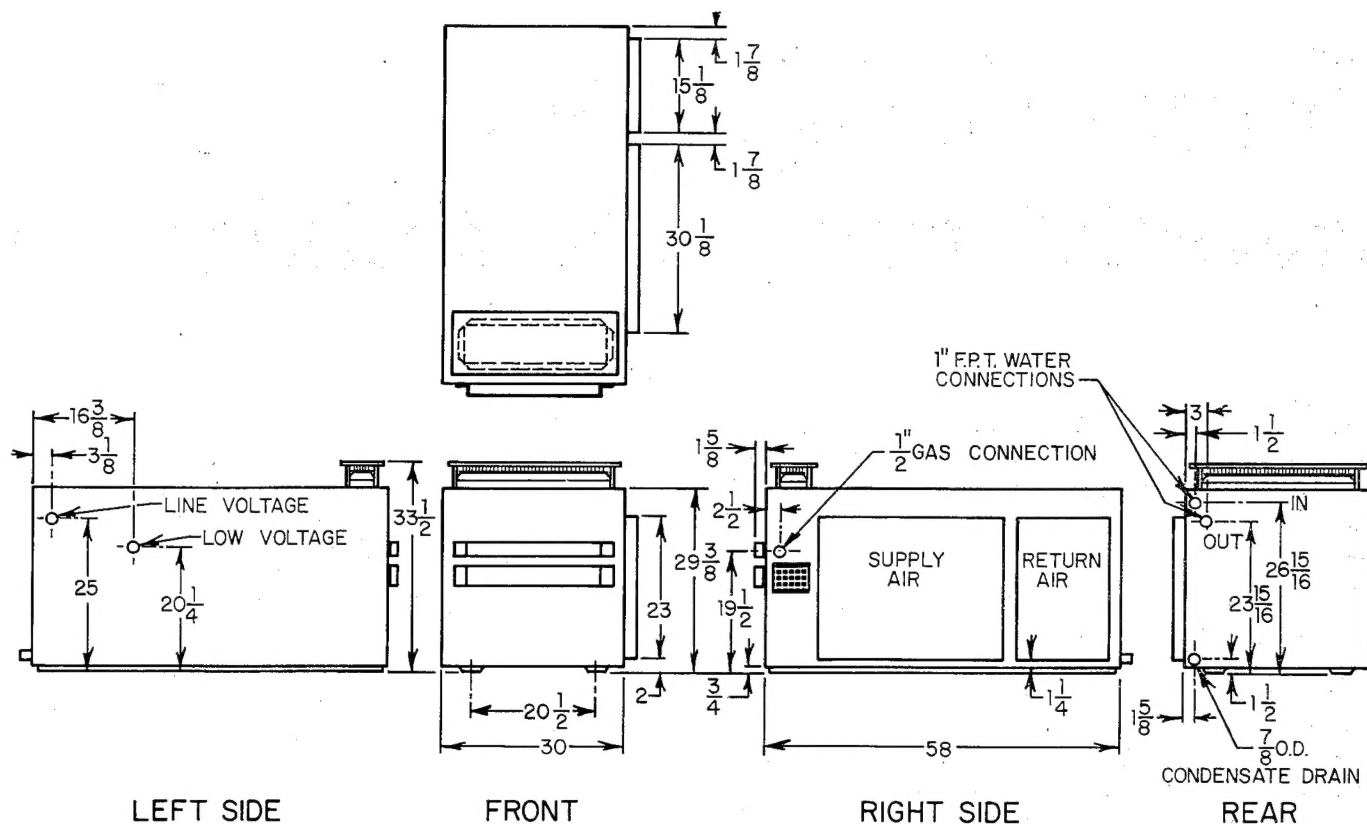
CAUTION: Be sure to protect the top and sides of the unit from cable damage when rigging the unit to be lifted.

Rooftop Installation

Level the unit on a base that is at least 6 inches above the roof to provide drainage from beneath the unit. Consult local codes for installation requirements. Be sure that the roof will support the additional weight.

Ground Level Installation

If the unit is to be installed on the ground, it should be placed on a level concrete slab with a minimum thickness of 4 inches.



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Figure 2—Dimensional Drawing

TABLE I - HEATING CAPACITY

Model		48W-379A & 60W-379A
Heating Input	Btuh	150,000
Heating Output	Btuh	112,500
Approved Temp Rise	°F	45 - 75

TABLE II - *RATINGS AND PERFORMANCE

Model		48W-379A	60W-379A
Cooling Capacity	Btuh	48,000	60,000
Airflow	CFM	1600	2000
External Static Pressure	In. w.c.	0.43	0.52
Entering Air Temp	°F	80DB/67WB	80DB/67WB
Entering Water Temp	°F	45	45
Water Flow	GPM	10	12.5
Water Pressure Drop	Ft w.c.	18.1	9.8

*Ratings given in Table II are for Model 48W-379A connected to a Model 48-453 Chiller and Model 60W-379A connected to a Model 60-452 Chiller.

TABLE III—ELECTRICAL CONNECTIONS

Model		48W-379A		60W-379A	
Nameplate Voltage-Hertz-Phase		208-60-1	230-60-1	208-60-1	230-60-1
Unit Ampacity for Electrical Conductor Sizing	Amps	6.2	4.9	8.6	6.9
Min Branch Circuit Wire Size (75°C copper*)	AWG	14	14	14	14
Max Branch Circuit Fuse Size	Amps	15	15	15	15

*If other than 75°C copper is used, determine size from unit ampacity and the National Electric Code. Voltage drop of wire selected must be less than 2% of unit rated voltage. Connections of aluminum wire must be in accordance with the National Electric Code.

NOTE: It is important that the unit be installed in a level position.

Clearances

The minimum clearance is 6 inches from the duct side, 24 inches on all other sides, and 0 inches on the bottom. This permits the use of combustible materials for supports.

CAUTION: When using rails, etc., as support, make allowances for surface water drainage under the unit.

II. GAS PIPING

2. A separate gas supply line should be installed to run directly from the meter to the furnace. Check your local utility for recommendations concerning existing lines. Choose a supply pipe sized large enough to keep the pressure loss as low as practical.

CAUTION: Never use pipe smaller than the gas connection to the furnace. Observe local codes for all gas pipe installations.

The following are pertinent recommendations:

1. Avoid low spots in long runs of pipe. It is best to grade all pipe 1/4 inch in every 15 feet to prevent traps. All horizontal runs should grade downward to risers. Risers should be used to connect to the furnace and to the meter.
2. Install a drip leg in the riser leading to the furnace. This drip leg will serve as a trap for dirt and condensate. Drip legs should be installed where condensate will not freeze. (See Figure 3 for drip leg location.)
3. A manual shutoff valve should be installed in the gas supply pipe near the furnace where it can be easily reached.
4. Place a ground joint union close to the unit between the gas controls manifold and the manual shutoff valve.

5. Support all piping with appropriate hangers, etc. The maximum distance between hangers should be 10 feet.

6. Joint compound (pipe dope) must be resistant to the action of propane gas.

WARNING: Never use a match or other open flame to check for gas leakage.

7. After all connections are made, check for leakage by using soap-and-water solution (or in accordance with local utility regulations).

III. DUCT CONNECTIONS

Before ductwork can be attached to the unit, remove and discard the cover panel that is located over the outlet and return air openings. The ductwork may be screwed or bolted to the unit flange with suitable gaskets to insure weathertight seal. Be sure that the sheet metal overlaps the flange on the unit.

All ductwork external of the structure must be properly insulated and waterproofed. All openings in the structure must be properly flashed and vibration-isolated in accordance with local codes and good building practices. The supply and return ductwork should be provided with an approved vibration eliminator.

NOTE: The vibration eliminator must be located within the structure.

NOTE: An external filter must be supplied and installed where easily accessible for service. For the minimum filter area, see the unit rating plate.

IV. VENTING

A vent cap assembly and a sheet metal angle (air deflector) are packaged and shipped with the unit. The package is located in the blower compartment.

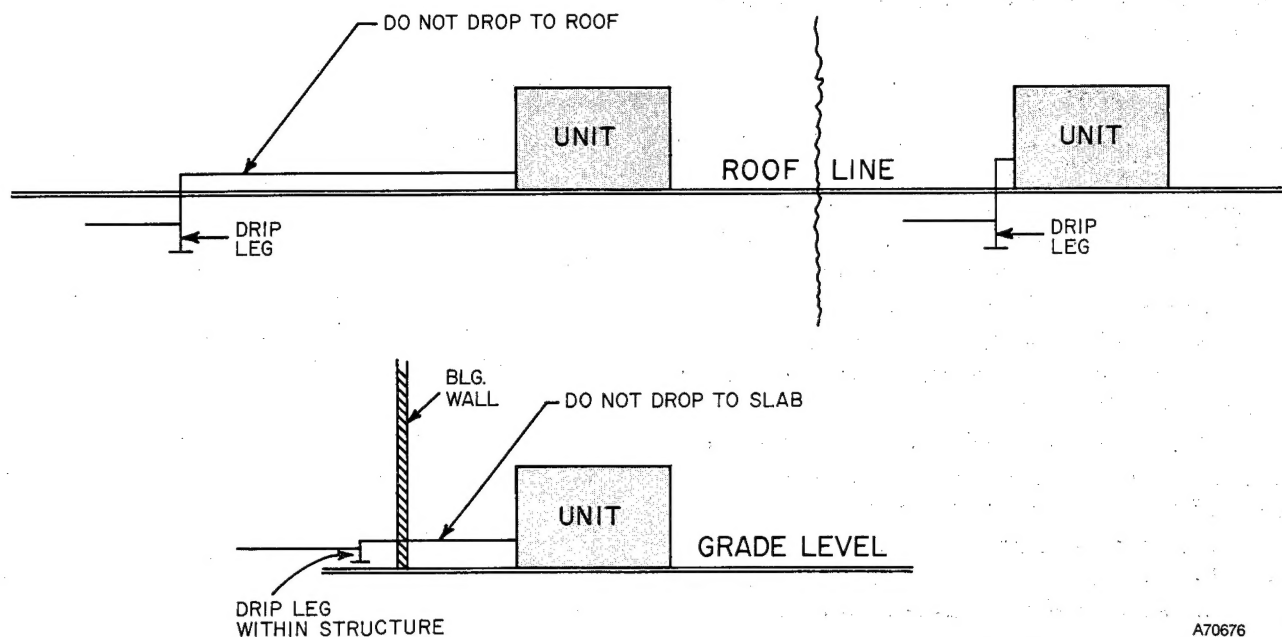
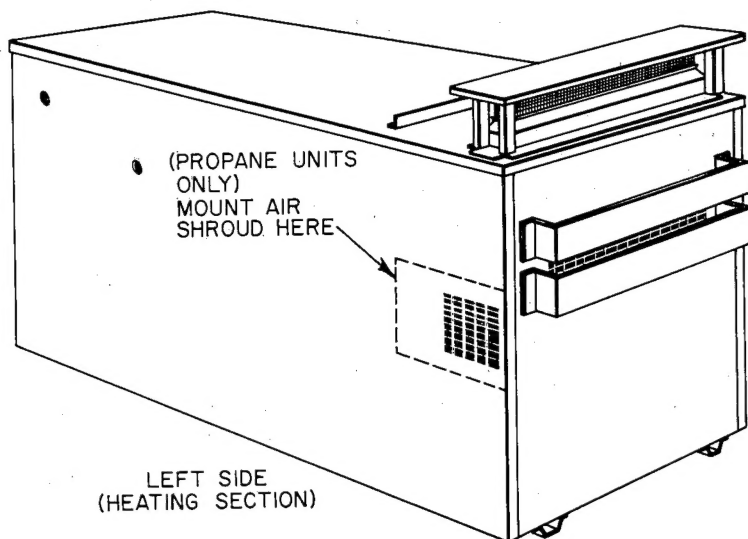
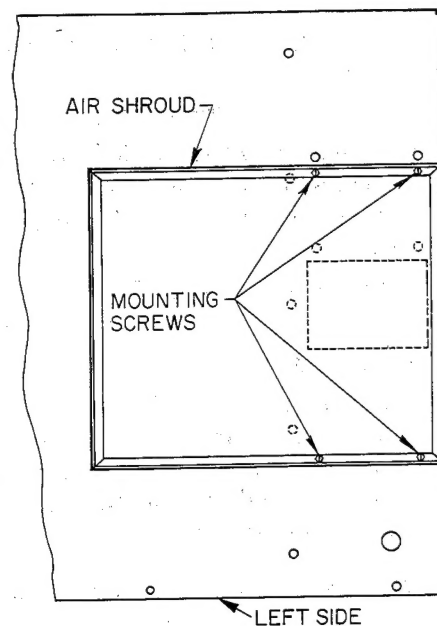


Figure 3—Drip Leg Location



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Figure 4—Mounting Air Shroud on Propane Unit

An air shroud is also shipped with propane units only. Install these items as follows:

1. Remove the cover from the vent opening on the unit.
2. Remove the top plate from the vent cap assembly (held by 4 sheet metal screws).
3. Use the screws supplied with the assembly to fasten the base section of the vent cap assembly to the top cover of the unit (the unit top is predrilled to receive the screws).
4. Reattach top plate removed in step 2.
5. Remove the 3 self-tapping screws located approximately 7 inches behind the vent cap. Use these screws to attach the sheet metal angle to the unit top cover at this location.
6. Use the screws enclosed in the air shroud package to mount the air shroud as shown in Figure 4 (propane units only).

V. COIL CONNECTIONS

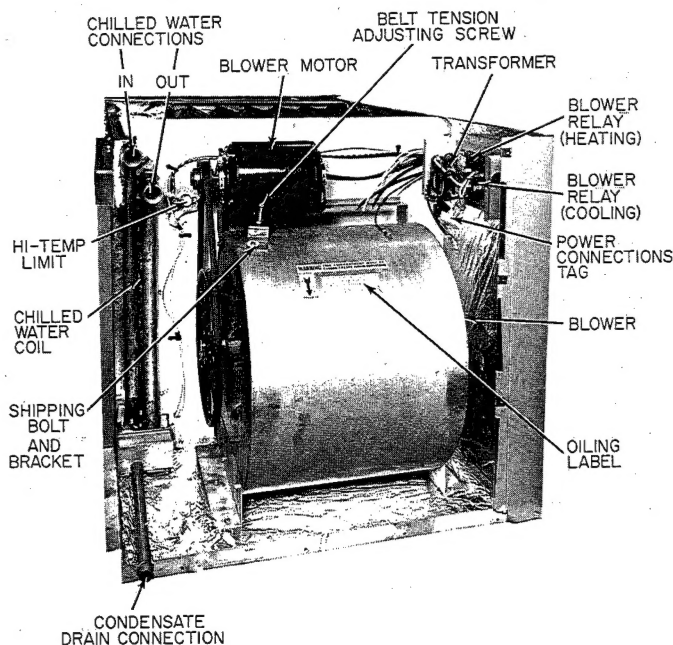
Figure 5 is a rear view photo of a partially disassembled Model 48W-379A unit.

The coil location and chilled water connections for both the 48W- and 60W-379A are the same for both units. These two models differ only in the size of the factory installed chilled water coil.

Two 2-3/8-inch diameter holes are provided in the right rear corner panel for the chilled water piping entrance to the unit.

NOTE: Two packaged vinyl grommets are shipped loose in the blower compartment. Insert one grommet in each of the 2-3/8-inch corner panel holes.

Route the chilled water piping through the two grommets and connect to the two 1-inch F.P.T. connectors on the coil header. Refer to Figure 5 for chilled water inlet and outlet connections.



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Figure 5—Rear View of Partially Disassembled 48W -379A

Refer to the chiller installation instructions for pertinent information concerning type and size of piping, length of pipe permissible, type of freeze protection, and chilled water additive required.

VI. ELECTRICAL CONNECTIONS

CAUTION: Before proceeding with the electrical connections, check the power supply to be sure that the voltage, frequency, and phase correspond to that specified on the unit rating plate.

All electrical connections are to be made in accordance with the National Electrical Code and the

local code governing such wiring. Field low voltage connections are to be made in accordance with the wiring diagram shown in Figure 8.

A separate electrical line should be run for this installation and should contain a fused switch in a convenient location. Refer to Electrical Connections (Table III) on page 2 for maximum fuse size and minimum wire size. Field wiring connections are made in the control box located in the blower compartment. See Figure 5.

NOTE: If aluminum conductors are used, the connections must be made in accordance with the National Electric Code. Aluminum wire connections *must* be made with special connectors. In preparing the wire just before installing the connector, all aluminum wire must be "brush-scratched" and the wire coated with a corrosion inhibitor, such as "Pen-trox A." When it is suspected that the connection will be exposed to moisture, it is very important to cover the entire connection completely to prevent an electro-chemical action that will cause the connection to fail very quickly. Reducing the effective size of the wire, such as cutting off strands so that the wire will fit a connector, is very poor practice. Proper size connectors should be used.

Wiring entrances are provided in the left side of the unit. Wiring entrances to the unit are shown in the dimensional drawing on page 2.

NOTE: The wiring entrances to the unit must be weathertight.

Use thermostat and subbase assembly P/N 34427DO31. Set thermostat heat anticipator at 0.8 amps.

VII. STARTUP AND ADJUSTMENTS

Before starting the unit, make sure the gas pipe is purged and free from air. Do not purge into the combustion chamber. All gas piping should be leak tested.

CAUTION: Remove shipping bolt from blower as described on label attached to blower access panel.

WARNING: Never use a match or other open flame to check for gas leakage.

Refer to chiller installation instructions for a circuit description of the cooling section.

The sequence of control operation for the furnace is as follows:

1. Turn on electrical power and gas supply to unit.
2. Refer to Figure 7. Note that the 24V control circuit voltage is applied across unit terminals 4 and X when power is turned on to the furnace.

When the pilot gas cock is opened, the pilot pressure switch closes and completes the circuit to the glow coil of pilot assembly (6B) which ignites the pilot. Approximately one minute after the pilot is ignited, heat from the pilot causes the pilot assembly's normally closed contacts to open and the normally open con-

tacts to close. This action breaks the ignition circuit and makes the control circuit to the gas valve.

When the thermostat calls for heating, terminal 4 is connected to terminal W through the thermostat. This completes the circuit to the gas valve (5B) and to the heating blower relay (2G). The energized gas valve opens and supplies gas to the burners. The contacts of the energized heating blower relay close and make the line voltage circuit to the blower motor (3A) and starts the blower fan.

Pilot Safety Test

If the pilot should go "out", the pilot assembly's normally open contacts (which were closed by pilot ignition) will reopen and break the circuit to the gas valve. The de-energized gas valve will close and shutoff the gas supply to the burners.

This safety feature can be checked by closing the pilot gas cock. The burners should shutoff within 90 seconds.

NOTE: The pilot will reignite automatically by means of glow coil ignition when the pilot gas cock is opened again. There will be a short time delay before pilot reignition occurs.

Limit Control

The function of the hi-temp limit control (7K) is to shutoff the gas supply to the burners and maintain an electrical circuit to the blower motor if the furnace becomes overheated. The limit control can be checked by gradually blocking off the return air after the furnace has been operating for at least five minutes. As soon as the limit has functioned to shutoff the gas valve, unblock the return air opening to permit normal air circulation.

Blower Fan Relay (Heating)

The heating blower fan relay (2G) is located in the control box and is adjustable to permit lengthening or shorting the "OFF" cycle. The "ON" cycle is automatically adjusted as the "OFF" cycle is changed.

The fan control adjusting lever is factory-set at the center position and should give optimum performance in most installations. However, on unusual installations or where the line voltage is considerably above or below the rated output, it may be necessary to increase or decrease the length of time the blower remains on. For longer blower operation, move the adjusting lever toward the "MAX OFF" position. In this position the control line switch makes contact sooner and takes the maximum time to break contact. For shorter blower operation, move the lever in the opposite direction.

Blower Fan Relay (Cooling)

The unit is also equipped with a cooling blower fan relay (2A). When a chiller is used in conjunction with the furnace to form a combination heating and cooling system, this relay is energized by the chiller transformer when there is a demand for cooling.

Adjusting Gas Input

The gas input must be checked and adjusted, if necessary, to agree with that shown on the unit rating plate (150,000 Btuh). The burners are equipped with fixed orifices. The burners on natural gas units use No. 41 drill size orifices while the burners on the propane units are equipped with No. 54 drill size orifices.

The natural gas unit is equipped with an A639 gas valve and a combination regulator/shutoff valve. The propane gas unit uses an A639 gas valve but is not equipped with a regulator. The regulator for propane units is located at the supply tank.

CAUTION: The unit may be run for short periods with the panels removed. Prolonged operation with the panels removed should not be attempted.

One of the two following methods may be used to adjust the gas input on a natural gas unit.

A. Measuring Gas Flow at Meter

All other gas appliances must be turned off when measuring the gas flow at meter to adjust the gas input. Proceed as follows when using this method.

1. Determine the number of seconds required for the gas meter test dial to complete one revolution.
2. Divide 3600 by the number of seconds in Step 1.
3. Multiply the result in Step 2 by the number of cubic feet of gas flow per hour.
4. Multiply the result of Step 3 by the Btu heating value of the gas (consult local utility for value). This is the total measured Btu/hr input.

Compare this value with the one shown on the rating plate.

Example: Suppose the size of the test dial is 2 cubic feet; it takes 50 seconds for the dial to complete one revolution; heating value of the gas is 1050 Btu per cubic foot. Proceed as follows:

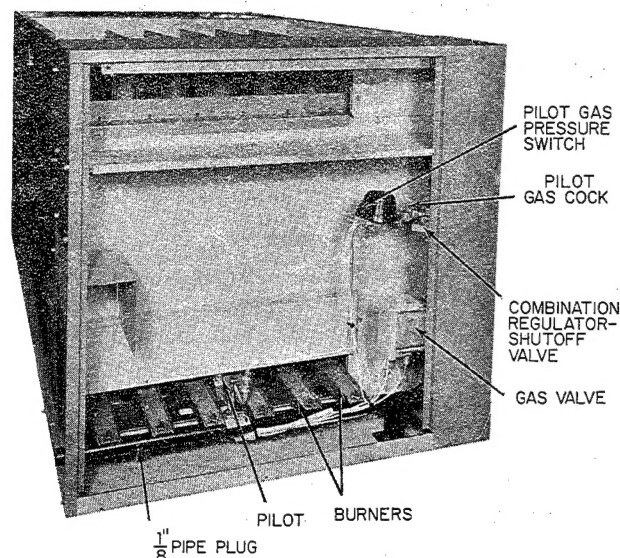
- (a) 50 seconds to complete one revolution.
- (b) 3600 divided by 50 equals 72.
- (c) $72 \times 2 = 144$ cubic feet per hour of gas flow.
- (d) $144 \times 1050 = 151,200$ Btuh input.

Only minor changes should have to be made at the pressure regulator to bring it within the rated input of the unit.

B. Using Water Manometer

When using a water manometer to measure the gas manifold pressure, proceed as follows to adjust the gas input.

1. Turn off gas to unit.
2. Remove the 1/8-inch pipe plug on the furnace manifold and connect manometer here. See Figure 6.
3. Turn on gas to unit. With the burners fired, adjust the pressure regulator to obtain the correct manifold pressure as shown in Table IV. Check with local gas utility for Btu value and specific gravity of gas in the area.



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Figure 6—Front View of Partially Disassembled 48W-379A

4. Remove manometer from manifold and replace the 1/8-inch pipe plug removed in Step 2 above.

Example: Heating value of gas is 1050 Btu and specific gravity of gas is 0.63.

- (a) From Table IV, the manifold pressure required for 150,000 Btuh input is 2.8 inches water column.
- (b) Set manifold pressure to 2.8 inches w.c. by adjusting gas pressure regulator adjusting screw.

If required manifold pressure exceeds 3.3 inches w.c. or is less than 2.7 inches w.c., the burner orifices should be sized according to unit requirements. Consult your Bryant Distributor.

CAUTION: Do not redrill orifices under any circumstances.

**TABLE IV — MANIFOLD PRESSURES
(Inches w.c.)**

BTU Value	Specific Gravity				
	0.59	0.61	0.63	0.65	0.67
900	3.6	3.7	3.8	3.9	4.0
950	3.2	3.3	3.4	3.5	3.6
1000	2.9	3.0	3.1	3.2	3.3
1025	2.8	2.9	3.0	3.1	3.2
1050	2.6	2.7	2.8	2.9	3.0
1100	2.4	2.5	2.6	2.7	2.8

Adjusting Pressure Regulator

If measured and rated input are not approximately the same, the gas pressure regulator may be adjusted as follows:

To increase input. Remove regulator sealing cap and turn gas pressure regulator adjusting screw clockwise.

To decrease input. Remove regulator sealing cap

and turn gas pressure adjusting screw counter-clockwise.

Checking Propane Gas Input

The burner orifices are sized for rated input with a manifold pressure of 11.0" w.c. for propane gas. Connect a manometer to the 1/8" pressure tap on the gas manifold. With the burners fired, adjust regulator at the supply tank to provide a pressure of 11.0" w.c.

Air Shutter Adjustment

To adjust the primary air to each burner, partially close the air shutter until there is a slight yellow tip on the top of the flame, then open the air shutter until the yellow tip just disappears. This should be done after the burners have been operating at full input for 5 or 10 minutes (approximately).

Airflow and Temperature Rise

The furnace is designed for operation within a temperature rise of 45°F to 75°F, all against an external static pressure up to 0.5 inch water column.

The external static pressure against which the blower is operating is the difference in pressures in the return air duct and discharge air duct near the furnace.

An adjustable flange on the blower motor pulley is used to adjust the blower speed. Proceed as described below to adjust blower motor speed.

WARNING: Turn off power at disconnect switch before removing blower belt.

1. Refer to Figure 5. Loosen the belt tensioning adjusting screw until there is slack in belt. Remove belt from pulleys.
2. Loosen setscrew in movable flange of blower motor pulley. Screw movable flange toward fixed flange to increase blower speed, and away from fixed flange to

reduce blower speed. Tighten set screw on one of the two flat surfaces on the pulley hub.

CAUTION: Increasing the blower speed will impose a greater load on the blower motor. Do not exceed the rated current draw of the motor.

3. Replace belt and adjust for proper tension. The belt should have approximately a 3/4-inch sag under normal finger pressure midway between pulleys.
4. Check motor pulley and blower pulley for proper alignment.

VIII. MAINTENANCE

Blower Motor Lubrication

Lubricate the blower motor per oiling label located in blower compartment. See Figure 5.

Cleaning the Heating Section

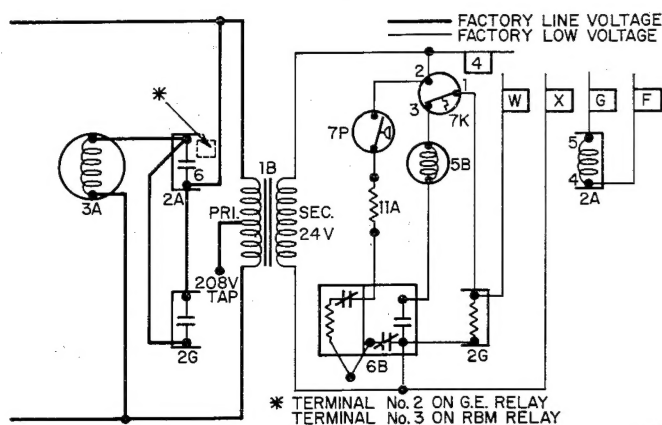
1. Turn off power at main disconnect switch.

WARNING: Tag switch with suitable warning label.

2. Remove front access panel.
3. Turn off manual gas valve and pilot gas cock.
4. Disconnect pilot and escapement tubing.
5. Remove burners.
6. Remove flue baffle retainer and vent section shelf.
7. Remove flue baffle.
8. Clean passages with suitable brush.
9. Reassemble furnace by reversing above procedure.

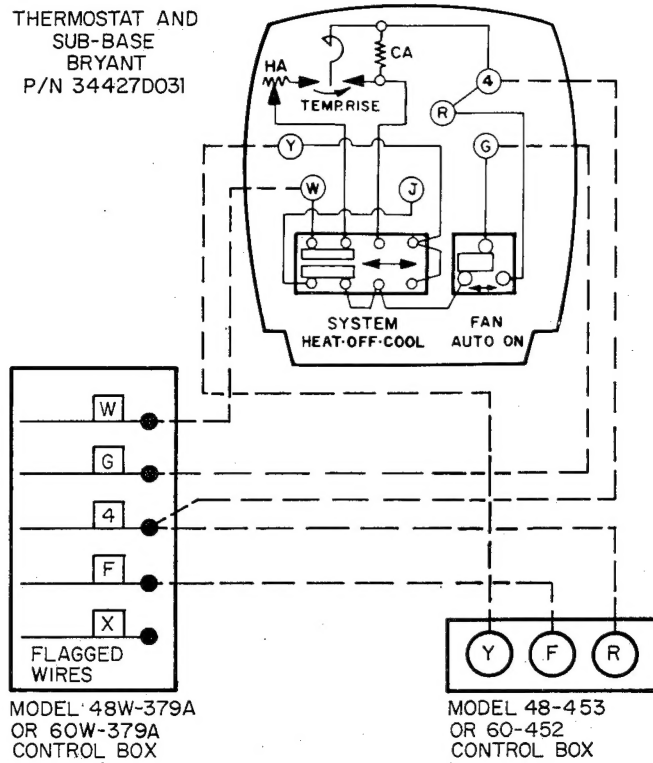
Filters

Every two months throughout the heating season, remove and inspect air filters for clogging due to dirt. When necessary, replace disposable filters or clean permanent type filters using clear water. Be sure to coat permanent filters with a water-soluble oil after cleaning if instructions require it.



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Figure 7—Models 48W- and 60W-379A Wiring Diagram



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Figure 8—Connecting Model 48W-379A to Model 48-453 Chiller or Connecting Model 60W-379A to Model 60-452 Chiller.